

# Algebra Review for Final

① Find the equation of the line passing through the points

$$(16, 0) \quad (12, 8). \quad m = \frac{8-0}{12-16} = \frac{8}{-4} = -2$$

$$y = m(x - x_1) + y_1 \Rightarrow \boxed{y = -2(x - 12) + 8}$$

② Find the equations of the lines parallel to and perpendicular to the line in problem #1 and passing through the point

$(2, 3)$  Parallel  $\rightarrow$  same slope  $\rightarrow -2 \rightarrow \boxed{y = -2(x - 2) + 3}$   
 Perpendicular  $\rightarrow$  negative reciprocal  $\rightarrow \frac{1}{2} \rightarrow \boxed{y = \frac{1}{2}(x - 2) + 3}$

③ Solve for x

$$\textcircled{a} \quad \begin{array}{r} 6x - 3 = 39 \\ +3 \quad +3 \end{array}$$

$$\frac{6x}{6} = \frac{42}{6}$$

$$x = 7$$

$$\textcircled{c} \quad 6x - 4(3x + 8) = 16$$

$$6x - 12x - 32 = 16$$

$$-6x - 32 = 16$$

$$-6x = 48 \quad x = -8$$

$$\textcircled{e} \quad 5(x - 2) - 14x = -3x - (5 - 4x)$$

$$\underline{5x} - 10 - \underline{14x} = \underline{-3x} - 5 + \underline{4x}$$

$$\begin{array}{r} -9x - 10 = x - 5 \\ +9x \quad +9x \end{array}$$

$$\begin{array}{r} -10 = 10x - 5 \\ +5 \quad +5 \end{array}$$

$$-5 = 10x$$

$$x = -\frac{1}{2}$$

$$\textcircled{b} \quad \begin{array}{r} 3x - 7 = 5x + 1 \\ -3x \quad -3x \end{array}$$

$$\begin{array}{r} -7 = 2x + 1 \\ -1 \quad -1 \end{array}$$

$$\begin{array}{r} -8 = 2x \\ \frac{-8}{2} = \frac{2x}{2} \end{array} \quad x = -4$$

$$\textcircled{d} \quad 7 - 3(2x - 5) = 1 - x$$

$$\begin{array}{r} 7 - 6x + 15 = 1 - x \\ +6x \quad +6x \end{array}$$

$$\begin{array}{r} 22 = 1 + 5x \\ -1 \quad -1 \end{array}$$

$$\frac{21}{5} = \frac{5x}{5} \quad x = 4.2$$

④ Find the equation for the tables below

①

x	1	2	3	4	5
y	-8	-5	-2	1	4

$-11 \quad +3 \quad +3 \quad +3 \quad +3$

$$y = 3x - 11$$

②

x	1	2	3	4	5
y	17	12	7	2	-3

$22 \quad -5 \quad -5 \quad -5 \quad -5$

$$y = -5x + 22$$

⑤ Given triangle  $\triangle WHY$  with the following coordinates,  $W(0,0)$ ,  $H(8,3)$ ,  $Y(2,9)$ , find the equation of the perpendicular bisector of  $\overline{HY}$ .

$$HY \rightarrow \text{slope } \frac{9-3}{2-8} = \frac{6}{-6} = -1$$

$$y = m(x - x_1) + y_1$$

$$y = -1(x - 2) + 9$$

perpendicular = neg. reciprocal

$$\text{orig. } -1 = -\frac{1}{1}$$

$$\text{neg recip.} = 1$$

midpoint  $\frac{8+2}{2}, \frac{3+9}{2}$

$(5, 6)$

$$y = 1(x - 5) + 6$$

⑥ Solve the following systems

(a)  $\begin{cases} y = -2x + 2 \\ 6x + 2y = 3 \end{cases}$

$y = -2(-\frac{1}{2}) + 2$   
 $y = 3$

$6x + 2(-2x + 2) = 3$   
 $6x - 4x + 4 = 3$   
 $2x + 4 = 3$   
 $2x = -1$   
 $x = -\frac{1}{2}$

(c)  $\begin{cases} 5x - y = -1 \\ 15x = 2y \end{cases}$

$\frac{15x}{2} = y$   
 $5x - \frac{15x}{2} = -1$   
 $-2.5x = -1$   
 $x = 0.4$

$15(0.4) = 2y$   
 $6 = 2y$   
 $y = 3$

(b)  $\begin{cases} -4x + 3y = 3 \\ 7x - 9y = 6 \end{cases}$

$-4(-3) + 3y = 3$   
 $12 + 3y = 3$   
 $3y = -9$   
 $y = -3$

$-12x + 9y = 9$   
 $7x - 9y = 6$   
 $\hline -5x = 15$   
 $x = -3$

(d)  $\begin{cases} x + 2y = 3 \\ 2x - y = 16 \end{cases}$

$x + 2y = 3$   
 $2x - y = 16$   
 $\hline 4x - 2y = 32$   
 $\hline 5x = 35$   
 $x = 7$

$7 + 2y = 3$   
 $-7 \quad -7$   
 $\hline 2y = -4$   
 $\hline y = -2$

⑦ Multiply

$$\begin{array}{l} \text{a) } (x+3)(2x-4) \\ 2x^2 - 4x + 6x - 12 \\ \hline 2x^2 + 2x - 12 \end{array}$$

$$\begin{array}{l} \text{b) } (3x-5)(x+7) \\ 3x^2 + 21x - 5x - 35 \\ \hline 3x^2 + 16x - 35 \end{array}$$

⑧ Factor

$$\begin{array}{l} \text{a) } x^2 + 8x + 15 \\ \quad \quad \quad \text{add} \quad \quad \text{mult} \\ (x+3)(x+5) \end{array}$$

$$\begin{array}{l} \text{b) } x^2 - 10x - 24 \\ \quad \quad \quad \text{add} \quad \quad \text{mult} \\ (x-12)(x+2) \end{array}$$

⑨ Solve for x

$$\begin{array}{l} \text{a) } x^2 + 5x + 4 = 0 \\ \text{Factor First} \\ (x+1)(x+5) = 0 \\ \quad \quad \quad \swarrow \quad \searrow \\ \quad \quad \text{What makes} \\ \quad \quad \text{these zero} \\ \hline x = -1, -5 \end{array}$$

$$\begin{array}{l} \text{b) } x^2 + 7x = 30 \\ \quad \quad \quad \swarrow \text{move to other side} \\ x^2 + 7x - 30 = 0 \\ \text{Factor} \\ (x+10)(x-3) = 0 \\ \quad \quad \quad \swarrow \quad \searrow \\ \quad \quad \text{make them 0} \\ \hline x = -10, 3 \end{array}$$

(10) Multiply and simplify

(a)  $\sqrt{3} \cdot \sqrt{2}$

$\sqrt{6}$

(b)  $3\sqrt{6} \cdot 2\sqrt{3}$

$6\sqrt{18} \rightarrow 6 \cdot \sqrt{9} \cdot \sqrt{2}$   
 $\downarrow \quad \downarrow \quad \downarrow$   
 $6 \cdot 3 \cdot \sqrt{2} = 18\sqrt{2}$

(c)  $7\sqrt{3} \cdot 7\sqrt{3}$

$49\sqrt{9} \rightarrow 49 \cdot 3 = 147$

(d)  $\sqrt{5} \cdot \sqrt{8}$

$\sqrt{40} \rightarrow \sqrt{4} \cdot \sqrt{10}$   
 $\downarrow \quad \downarrow$   
 $2\sqrt{10}$

(11) Solve for b

(a)  $p = 2b + 2h$   
 $\quad \quad \quad -2h$

$\frac{p-2h}{2} = \frac{2b}{2}$

$\frac{p-2h}{2} = b$

(b)  $a^2 + b^2 = c^2$   
 $\quad \quad \quad -a^2$

$b^2 = c^2 - a^2$

square root

$b = \pm \sqrt{c^2 - a^2}$

(12) Solve for x

$$\textcircled{a} \quad \frac{7}{21} = \frac{x}{18}$$

$$7 \cdot 18 = 21x$$

$$\frac{126}{21} = \frac{21x}{21} \quad x = 6$$

$$\textcircled{c} \quad \frac{x}{5} = \frac{x+3}{20}$$

$$5(x+3) = 20 \cdot x$$

$$\begin{array}{r} 5x + 15 = 20x \\ -5x \quad -5x \end{array}$$

$$15 = 15x$$

$$x = 1$$

$$\textcircled{b} \quad \frac{20}{13} = \frac{60}{x}$$

$$13 \cdot 60 = 20x$$

$$\frac{780}{20} = \frac{20x}{20} \quad x = 39$$

$$\textcircled{d} \quad \frac{x-1}{2x+3} = \frac{4}{13}$$

$$13(x-1) = 4(2x+3)$$

$$\begin{array}{r} 13x - 13 = 8x + 12 \\ -8x \quad -8x \end{array}$$

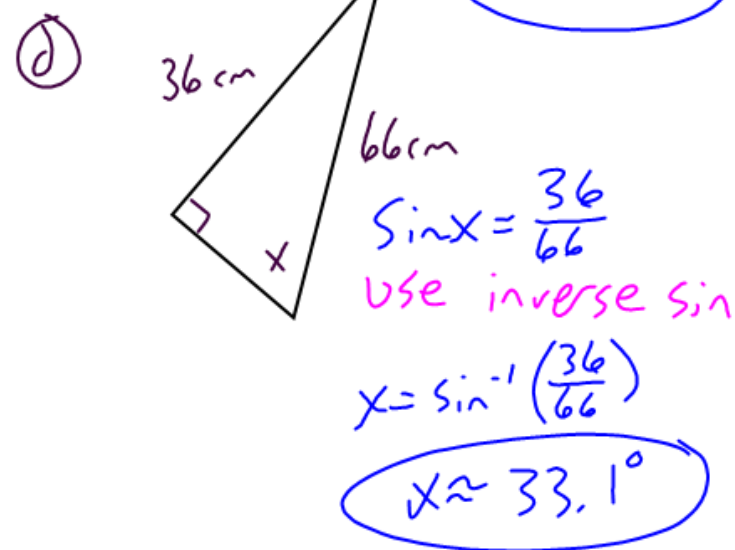
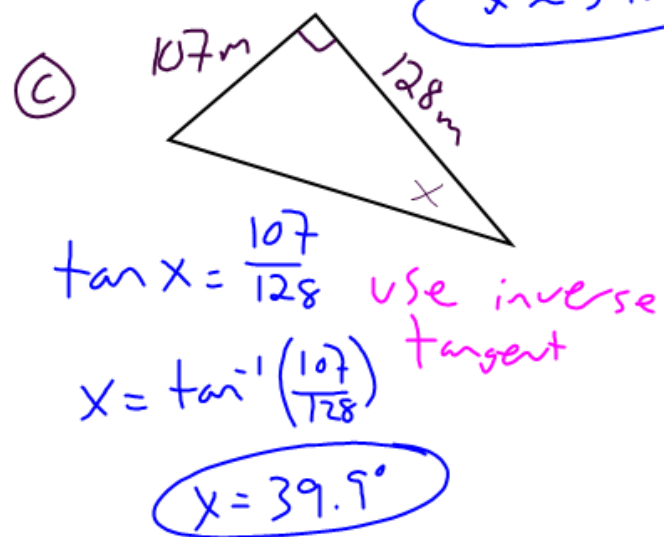
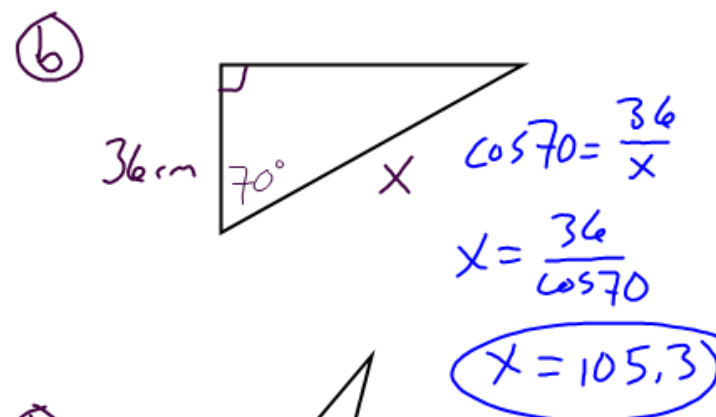
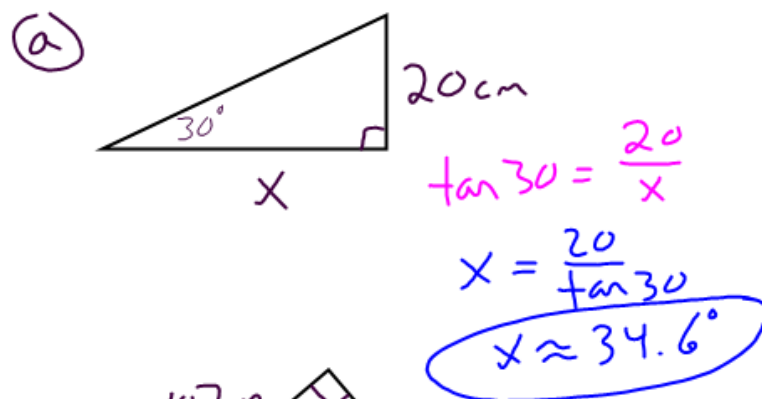
$$5x - 13 = 12$$

$$+13 \quad +13$$

$$5x = 25$$

$$x = 5$$

(13) Solve for x





# Answers to Alg. Review

①  $y = -2(x-16)$  or  $y = -2(x-12)+8$  or  $y = -2x+32$

②  $y = -2(x-2)+3$   
parallel

$y = \frac{1}{2}(x-2)+3$   
perpendicular

③ a  $x=7$  b  $x=-4$  c  $x=-8$  d  $x=4.2$  e  $x=-\frac{1}{2}$

④ a  $y=3x-11$  b  $y=-5x+22$

⑤  $y=x+1$

⑥ a  $(-\frac{1}{2}, 3)$  b  $(-3, -3)$  c  $(\frac{2}{5}, 3)$  d  $(7, -2)$

Answers cont.

⑦ a  $2x^2 + 2x - 12$

b  $3x^2 + 16x - 35$

⑧ a  $(x+3)(x+5)$

b  $(x-12)(x+2)$

⑨ a  $x = -4, -1$

b  $x = -10, 3$

⑩ a  $\sqrt{6}$

b  $6\sqrt{18} \Rightarrow 18\sqrt{2}$

c  $49\sqrt{9} \Rightarrow 147$

d  $\sqrt{40} \rightarrow 2\sqrt{10}$

⑪ a  $b = \frac{p-2h}{2}$

b  $b = \pm\sqrt{c^2 - a^2}$

⑫ a  $x = 6$

b  $x = 3a$

c  $x = 1$

d  $x = 5$

⑬ a  $x \approx 35$

b  $x \approx 105$

c  $x \approx 40^\circ$

d  $x \approx 33^\circ$